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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

NOTICE OF APPEAL FROM THE EXAMINER
TO THE BOARD OF APPEALS

Applicant(s): Shedden
Serial No.: 09/487,401
Filed: January 19, 2000
For: ACTIVE LOG READ I/O BALANCING FOR LOG DUPLEXING
Examiner: Jean B. Fleurantin
Art Unit: 2172
Confirmation No.: 3119
Customer No.: 27673 Attorney Docket: ST9-99-033

Mail Stop Appeal Brief-Patents
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

We are enclosing for filing in the above-identified application the following:

1. Appellant's Appeal Brief (*in triplicate*);
2. Transmittal letter in duplicate; and
3. Postcard.

Please charge the patent appeal fee in the amount of **\$340.00** and any additional fees if necessary to Deposit Account No. **09-0460** in the name of International Business Machines Corporation. A duplicate copy of this sheet is attached.

Respectfully submitted,

November 1, 2004

Date

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Keysha Whitaker

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(Signature of person mailing paper)



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant: Shedden
Serial No.: 09/487,401
For: ACTIVE LOG READ I/O BALANCING FOR LOG DUPLEXING
Filed: 19 JAN 2000
Examiner: Jean B. Fleurantin
Art Unit: 2172
Confirmation No.: 3119
Customer No.: 27,623 Attorney Docket No.: ST9-99-033

APPEAL BRIEF FILED UNDER 35 U.S.C. §134

Mail Stop Appeal Brief - Patents
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Appeal Brief is herewith filed under 35 U.S.C. §134 and in accordance with the provisions of 37 C.F.R. §41.37(a), and is believed to comply with the requirements set forth in 37 C.F.R. §41.37(c). The claims on appeal are set forth in an Appendix, included herewith.

The Notice of Appeal was mailed on 1 SEP 2004. As such, no petition or fee for an extension of time is required to file this Appeal Brief. However, should the undersigned attorney be mistaken, please consider this to be a petition for any required extension of time, and please then also charge Deposit Account No. 01-0467 for the required fee. Likewise, the Commissioner is hereby authorized

to charge Deposit Account No. 01-0467 for any required fee not submitted herewith, or submitted incorrectly, so as to maintain the pendency of the above-identified patent application.

(1) Real Party in Interest

The real party in interest is International Business Machines Corporation.

(2) Related Appeals and Interferences

The undersigned attorney is not aware of any related appeals or interferences.

(3) Status of the Claims

Claims 1 - 18 are pending in this application, and are the subject of this Appeal.

In an Office Action mailed 1 JUN 2004 (hereinafter "the Office Action"), the Examiner made final his rejection of claims 1 - 18 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,832,515 to Ledain et al. (hereinafter "the Ledain et al. patent") The rejected claims can be found below in an Appendix.

(4) Status of Amendments

No amendments to claims 1 - 18 were proposed subsequent to final rejection.

(5) Summary of Claimed Subject Matter

This Summary makes reference to two figures. These figures are provided below, at the end of the Summary.

The invention is embodied in a method for enabling improved access to data stored in a log of a computer memory system, wherein the computer memory system has multiple copies of the log, i.e., a

primary log and a secondary log. Each log stores data transactions with a database system stored on the computer memory system. The method initially responds to a process request for access to a log, by determining a parameter indicative of demand for access to one of the copies of the log. If the parameter has reached a threshold value, accessing processes are thereafter distributed between the primary and secondary copies of the log so as to balance the work dispatched to the respective log copies. The invention is implemented by a computer system and may also be incorporated into a memory media device such as a magnetic disk. (Specification page 3, line 28 – page 4, line 13)

FIG. 1 illustrates an exemplary computer hardware environment that implements the present invention. Computer system 102 is comprised of one or more processors connected to one or more data storage devices 104 and 106. (Specification page 5, lines 13 – 17)

In some recovery scenarios (e.g., recovering from a database media failure), there may be a number of processes concurrently reading from the primary copy of the log. This may generate I/O contention for the device(s) containing the primary copy of the log, which will, consequently, extend the recovery period. (Specification page 8, lines 24 – 29)

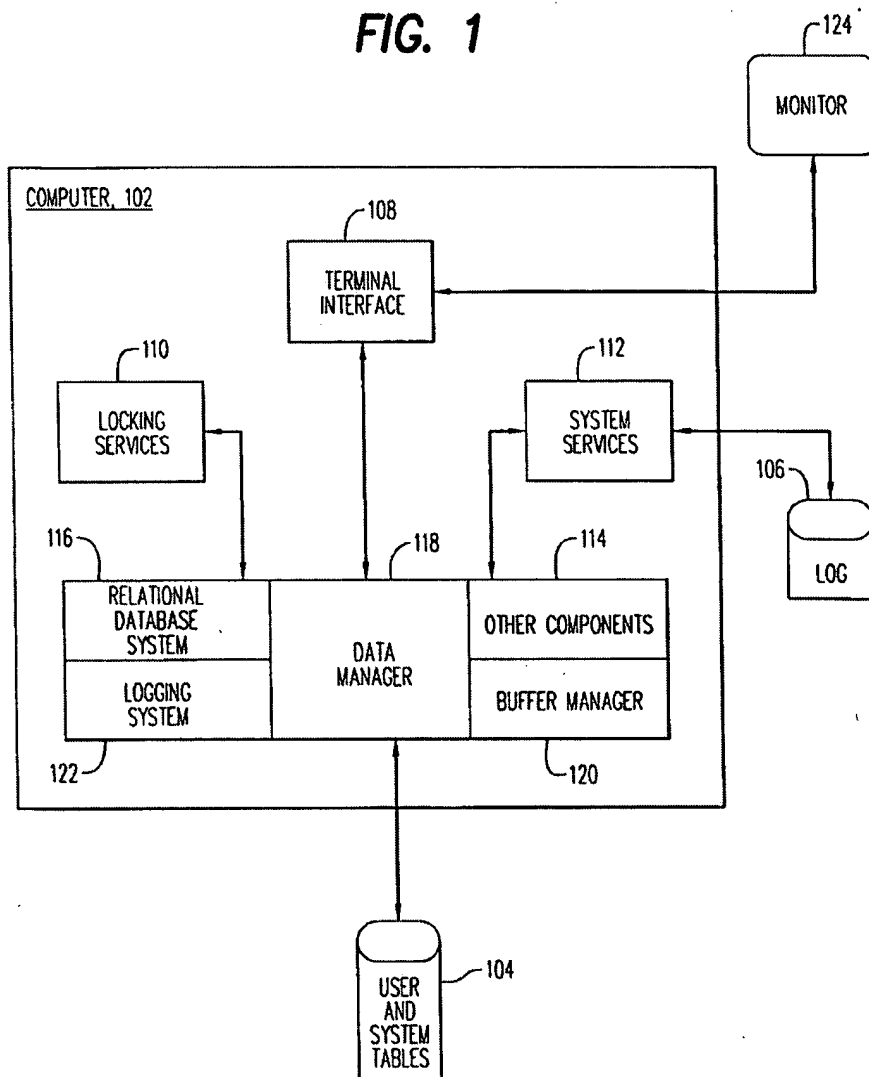
The present invention provides a logging system 122 for reducing I/O device contention for the primary copy of a log, thus reducing the time required to recover from media or system failures. Logging system 122 relieves some of the device contention by satisfying a portion of the log read requests from the secondary copy of the log in periods of concurrent log read activity. In the embodiment illustrated in the logic flow diagram of Fig. 2, logging system 122 maintains a count of active processes reading the log (step 200). If the count is below a threshold count, logging system 122 assigns a preference for the primary copy of the log to new processes requesting data from the log (step 202). (Specification page 9, lines 1 – 10)

If the threshold count is reached, logging system 122 distributes preference assignments between the primary copy of the log and the secondary copy of the log, in respect of new processes requesting data from the log (step 204). It is preferred that the preference assignments be alternated as between the log copies so as to balance the work of the respective logs and reduce possible delay times. For a process assigned a preference for the respective copy of the log, log read requests are satisfied

from the respective copy of the log (step 206). This action reduces queuing time and quickens system recovery time. (Specification page 9, lines 12 – 23)

As an alternative to keeping count of processes attempting to access the primary log, a count of requests that have been queued to the primary log may be used. (Specification page 9, line 31 – page 10, line 3)

FIG. 1



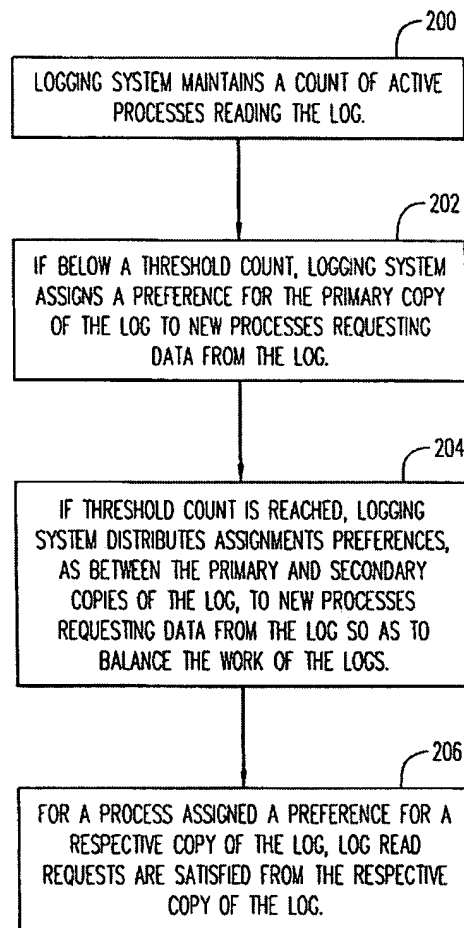


FIG. 2

(6) Grounds of Rejection to be Reviewed on Appeal

The issue presented for review is the propriety of the Examiner's final rejection of claims 1-18 under 35 U.S.C. §103(a) as being unpatentable over the Ledain et al. patent.

(7) Argument

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

(a) Claims 1, 2, 7, 8, 13 and 14 stand or fall together.

The set of claims on appeal contains three independent claims, namely claims 1, 7 and 13. Below, Appellant argues that the Ledain et al. patent does not expressly teach or suggest all the limitations of claims 1, 7 and 13, and therefore, that the final rejection of claims 1, 7 and 13, and all claims that depend from any of claims 1, 7 or 13, should be reversed.

Claim 1 provides a method for enabling improved access to data from a computer memory system during a data recovery operation, where the computer memory has data in a first log, and a copy of the data in a second log. The method includes (a) responding to a process request to read the data from the first log, by determining a parameter indicative of demand for access to read the first log, and (b) assigning the process to read the copy of the data from the second log if the parameter has reached a threshold value. The process is one of a

plurality of processes concurrently attempting to read the first log during the data recovery operation.

The Ledain et al. patent discloses a storage system having main filesystems disks 40 (col. 9, line 6) and log device disks 52 (col. 9, line 28). The system also includes a log device pseudo-device driver 44 that selectively provides for the routing of filesystem data directed to main filesystem disks 40 to be at least temporarily stored and potentially read back from log device disks 52 (col. 9, lines 24 – 28).

The Office Action, on page 4, states that the Ledain et al. patent discloses a computer memory system having data in a first log (log device pseudo-device driver 44) and a copy of the data in a second log (log device disks 52). Appellant respectfully disagrees with the Office Action's characterization of log device pseudo-device driver 44 as being a log.

Log device pseudo-device driver 44, as explained above, is for the routing of filesystem data directed to the main filesystem disks 40 to be at least temporarily stored and potentially read back from the log device disks 52 (col. 9, lines 24 – 28). Thus, log device pseudo-device driver 44 is for routing filesystem data (i) to log device disks 52, and thereafter, (ii) to main filesystem disks 40. Therefore, contrary to the assertion in the Office Action, log device pseudo-device driver 44 is not a log.

Nevertheless, Appellant recognizes that the Ledain et al. patent discloses two storage device, namely main filesystem disks 40 and log device disks 52. However, the Ledain et al. patent does not described main filesystem disks 40 and log device disks 52 as having a relationship in which one serves as a first log for data, and the other serves as a second log having a copy of the data. Consequently, Appellant respectfully submits that the Ledain et al. patent neither discloses nor suggests that a computer memory has **data in a first log, and a copy of the data in a second log**, as recited in claim 1.

The Office Action, on page 4, states that the Ledain et al. patent, at col. 9, lines 19 – 22, discloses responding to a process request to read data from a first log by determining a parameter indicative of demand for access to read the first log. Appellant respectfully disagrees.

The Ledain et al. patent, at col. 9, lines 19 – 24, which includes the cited lines 19 - 22, states:

Thus, at least data that is to be written to or read from a selected filesystem nominally maintained on the main filesystem disks 40 is routed through the log device pseudo-device driver 44 and may be made subject to the control operations established by the execution of the log device pseudo-device driver 44.

Although, the passage at col. 9, lines 19 – 24 mentions "control operations", it does not disclose any particular parameter, much less **a parameter indicative of demand for access to read a log**, as recited in claim 1.

The Office Action, on page 5, states that the Ledain et al. patent, at col. 9, lines 45 – 50 discloses a process being one of a plurality of processes concurrently attempting to read a first log during a data recovery operation, and also cites col. 5, lines 23 – 26. The cited passage at col. 9, lines 45 – 50 states:

The write data path 42 through the log device pseudo-device driver 44 to the log device disk 52 will be co-dependant on the concurrent use of the read data path from the log device disk 52 through the log device pseudo-device driver 44 to the operating system core 32 via the path 50 (emphasis added).

The cited passage at col. 5, lines 23 – 26 states:

Therefore, a substantial need now exists for a new filesystem architecture that is optimized, including during ongoing operation, for both read and write accesses concurrent with processes for ensuring data integrity and fast crash recovery, and the many practical issues involved in providing and managing a high performance filesystem (emphasis added).

Thus, the cited passage at col. 9, lines 45 – 50 discloses a write path as being co-dependant on the concurrent use of a read data path, and the cited passage at col. 5, lines 23 – 26 discloses a filesystem

architecture that is optimized for both read and write accesses, and that the optimization is concurrent with processes for ensuring data integrity and fast crash recovery. Neither of the cited passage at col. 9, lines 45 – 50 nor the cited passage at col. 5, lines 23 – 26 describe or suggest that a processes is one of a **plurality of processes concurrently attempting to read** a first log during a data recovery operation, as recited in claim 1.

The Office Action, on page 5, acknowledges that the Ledain et al. patent does not explicitly disclose assigning a process to read a copy of data from a second log if a parameter has reached a threshold value. However, the Office Action then suggests that this feature is well known, and cites a passage at col. 29, lines 57 - 60, and a passage at col. 30, lines 19 – 24. The cited passage at col. 29, lines 57 – 60 states:

Once a log disk has reached the filled segment threshold, the head of the logical log wraps to the next log disk in sequence. Thus, the log structured device operates as a logically continuous circular buffer for data segments (emphasis added).

The cited passage at col. 30, lines 19 – 24 states:

As part of the data segment cleaning, the relocations information within the user data segment trailer is examined to determine whether any particular log block has been relocated through cleaning in excess of a threshold number of relocations; the threshold number may be set to an adaptive control defined value (emphasis added).

Thus, the cited passage at col. 29, lines 57 – 60 is directed toward a feature of a device operating as a circular buffer, and the cited passage at col. 30, lines 19 – 24 is directed toward an operation that considers whether a log block has been relocated in excess of a threshold number of relocations. These passages include the word "threshold", but neither of the cited passage at col. 29, lines 57 – 60 nor the cited passage at col. 30, lines 19 – 24 even describe or suggest a parameter indicative of demand for access to read a first log, much less assigning a process to read a copy of the data from a second log if **the parameter (indicative of demand for access to read a first log) has reached a threshold value**, as recited in claim 1.

Moreover, where, as explained above, Ledain et al. patent neither discloses nor suggests that a computer memory has data in a first log, and a copy of the data in a second log, the Ledain et al. patent cannot possibly describe or suggest assigning the process **to read the copy of the data from the second log** if the parameter has reached a threshold value, as recited in claim 1.

For the foregoing reasons, Appellant respectfully submits that the Ledain et al. patent neither describes nor suggests all of the elements of claim 1. Accordingly, Appellant submits that claim 1 is patentable over the Ledain et al. patent.

Claim 2 depends from claim 1. By virtue of this dependence, claim 2 is also patentable over the Ledain et al. patent.

Claim 7 is an independent claim and includes recitals similar to those of claim 1, as described above. Thus, claim 7, for reasons similar to that of claim 1, is patentable over the Ledain et al. patent.

Claim 8 depends from claim 7. By virtue of this dependence, claim 8 is also patentable over the Ledain et al. patent.

Claim 13 is an independent claim and includes recitals similar to those of claim 1, as described above. Thus, claim 13, for reasons similar to that of claim 1, is patentable over the Ledain et al. patent.

Claim 14 depends from claim 13. By virtue of this dependence, claim 14 is also patentable over the Ledain et al. patent.

(b) Claims 3, 9 and 15 stand or fall together.

Claim 3 depends from claim 1 and further recites that the parameter is a count of the plurality of processes assigned to the first log. The Office Action, on page 6, suggests that the Ledain et al. patent discloses this feature at col. 29, lines 57 – 59. However, as explained above in support of claim 1, the passage at col. 29, lines 57 – 60 (which includes the cited lines 57 – 59) is directed toward a feature of

a device operating as a circular buffer. Moreover, the passage expressly describes a filled segment threshold, and therefore, it does not disclose or suggest parameter is **a count of the plurality of processes assigned to the first log**, as recited in claim 3. As such, claim 3 is patentable over the Ledain et al. patent not only because claim 3 depends from claim 1, but also on its own merits.

Claims 9 and 15 recite features similar to those of claim 3.

(c) Claims 4, 5, 10, 11, 16 and 17 stand or fall together.

Claims 4 and 5 each depend from claim 3, and further recite a feature that involves a second log, and in particular, an attempt to balance work of the first and second logs. Appellant notes that pages 6 and 7 of the Office Action cite the Ledain et al. patent, col. 17, line 65 – col. 18, line 6 in support of the rejections of claims 4 and 5. The cited passage at col. 17, line 65 – col. 18, line 6 states:

The balance of the current data segment may be filled with new data blocks written through the data interface 66 or as a result of cleaning the new log tail data segment. Where data blocks are actively being directed through the data interface 66 for storage on the log device, the compacted data blocks obtained from the prior log tail data segment may be mixed in order of receipt by the segment I/O routine 78 into the current segment buffer maintained by the segment I/O routines 78.

Appellant does not find that the cited passage at col. 17, line 65 – col. 18, line 6 discloses a second log, much less an attempt **to balance work of the first and second logs**, as recited in claims 4 and 5. Thus, claim 4 and 5, on their own merits, are also patentable over the Ledain et al. patent.

Claims 10 and 16 recite features similar to those of claim 4, and claims 11 and 17 recited features similar to those of claim 5.

(d) Claims 6, 12 and 18 stand or fall together.


Claim 6 depends from claim 1 and further recites that the parameter is a count of requests that have been queued to the first log. The Office Action, on page 7, suggests that the Ledain et al. patent discloses this feature in the passage at col. 29, lines 57 – 59. However, as explained above in support

of claims 1 and 3, the passage at col. 29, lines 57 – 60 (which includes the cited lines 57 – 59) is directed toward a feature of a device operating as a circular buffer. Moreover, the passage expressly describes a filled segment threshold, and therefore, it does not disclose or suggest parameter is **a count of requests that have been queued to the first log**, as recited in claim 6.

Claims 12 and 18 recite features similar to those of claim 6.

In view of the foregoing arguments, Appellant respectfully requests that the Board of Appeals reverse the final rejection of claims 1 - 18 under 35 U.S.C. §103(a) as being unpatentable over the Ledain et al. patent, thereby enabling all of the pending claims to be allowed.

Respectfully submitted,



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11-1-04

Date

(8) Claims Appendix

The claims on appeal are set forth below.

1. (previously presented) A method for enabling improved access to data from a computer memory system during a data recovery operation, said computer memory system having said data in a first log, and a copy of said data in a second log, the method comprising the steps of:
 - a) responding to a process request to read said data from said first log, by determining a parameter indicative of demand for access to read said first log; and
 - b) assigning the process to read said copy of said data from said second log if said parameter has reached a threshold value,wherein said process is one of a plurality of processes concurrently attempting to read said first log during said data recovery operation.
2. (previously presented) The method as recited in claim 1, wherein said first log is a primary log.
3. (previously presented) The method as recited in claim 1, wherein said parameter is a count of said plurality of processes assigned to said first log.
4. (previously presented) The method as recited in claim 3, wherein, when said count of said plurality of processes assigned to said first log reaches a predetermined threshold, step b) distributes new process assignments to both said first log and said second log in an attempt to balance work of said first and second logs.
5. (previously presented) The method as recited in claim 3, wherein, when said count of said plurality of processes assigned to said first log reaches a predetermined threshold, step b) alternates new process assignments to said first log and said second log in an attempt to balance work of said first and second logs.
6. (previously presented) The method as recited in claim 1, wherein said parameter is a count of requests that have been queued to said first log.

7. (previously presented) A memory media including instructions for controlling a computer to enable improved access to data from a memory system during a data recovery operation, said memory system having said data in a first log and a copy of said data in a second log, the memory media comprising:

- a) means for controlling said computer to respond to a process request to read said data from said first log, by determining a parameter indicative of demand for access to read said first log;
and
- b) means for controlling said computer to assign the process to read said copy of said data from said second log if said parameter has reached a threshold value,
wherein said process is one of a plurality of processes concurrently attempting to read said first log during said data recovery operation.

8. (previously presented) The memory media as recited in claim 7, wherein said first is a primary log.

9. (previously presented) The memory media as recited in claim 7, wherein said parameter is a count of said plurality of processes assigned to said first log.

10. (previously presented) The memory media as recited in claim 9, wherein, when said count of said plurality of processes assigned to said first log reaches a predetermined threshold, means b) controls said computer to distribute new process assignments to both said first log and said second log in an attempt to balance work of said first and second logs.

11. (previously presented) The memory media as recited in claim 9, wherein, when said count of said plurality of processes assigned to said first log reaches a predetermined threshold, means b) controls said computer to alternate new process assignments to said first log and said second log in an attempt to balance work of said first and second logs.

12. (previously presented) The memory media as recited in claim 7, wherein said parameter is a count of requests that have been queued to said first log.

13. (currently amended) A computer system that enables improved access to data from a memory system during a data recovery operation, said memory system having said data in a first log and a copy of said data in a second log, the computer system further comprising:

- a) means for determining a parameter indicative of demand to read said first log; and
 - b) logging means responsive to a process request to read said data from said first log, by assigning the process to read said data from said second log if said parameter has reached a threshold value,
- wherein said process is one of a plurality of processes concurrently attempting to read said first log during said data recovery operation.

14. (previously presented) The computer system as recited in claim 13, wherein said first log is a primary log.

15. (previously presented) The computer system as recited in claim 13, wherein said parameter is a count of said plurality of processes assigned to said first log.

16. (previously presented) The computer system as recited in claim 15, wherein said logging means, when said count of said plurality of processes assigned to said first log reaches a predetermined threshold, distributes new process assignments to both said first log and said second log in an attempt to balance work of said first and second logs.

17. (previously presented) The computer system as recited in claim 15, wherein said logging means, when said count of processes assigned to said first log reaches a predetermined threshold, alternates new process assignments to said first log and said second log in an attempt to balance work of said first and second logs.

18. (previously presented) The computer system as recited in claim 13, wherein said parameter is a count of requests that have been queued to said first log.

(9) Evidence Appendix

None.

(10) Related Proceedings Appendix

None.